

0590



1761

7/17 1761

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/909,464A

DATE: 02/05/2002
TIME: 12:16:21

Input Set : A:\PTO_VSK.txt
Output Set: N:\CRF3\02052002\I909464A.raw

3 <110> APPLICANT: Lanahan, Michael
4 Miller , Edward S.
5 Kelly, Robert M.

7 <120> TITLE OF INVENTION: METHODS FOR HIGH-TEMPERATURE HYDROLYSIS OF GALACTOSE-
CONTAINING

8 OLIGOSACCHARIDES IN COMPLEX MIXTURES
10 <130> FILE REFERENCE: 9207.4
C--> 12 <140> CURRENT APPLICATION NUMBER: US/09/909,464A
C--> 12 <141> CURRENT FILING DATE: 2001-07-19
12 <150> PRIOR APPLICATION NUMBER: US 60/220,211
13 <151> PRIOR FILING DATE: 2000-07-22
15 <160> NUMBER OF SEQ ID NOS: 2
17 <170> SOFTWARE: PatentIn version 3.1
19 <210> SEQ ID NO: 1
20 <211> LENGTH: 1659
21 <212> TYPE: DNA
22 <213> ORGANISM: Thermotoga maritima
24 <220> FEATURE:
25 <221> NAME/KEY: CDS
26 <222> LOCATION: (1)..(1659)
27 <223> OTHER INFORMATION:
30 <400> SEQUENCE: 1

ENTERED

RECEIVED

FEB 13 2002

TC 1700

RECEIVED

OCT 96
FEB 25 2002
DPE / JEW'S

| | |
|--|----|
| 31 atg gaa ata ttc gga aag acc ttc aga gag gga aga ttc gtt ctc aaa | 48 |
| 32 Met Glu Ile Phe Gly Lys Thr Phe Arg Glu Gly Arg Phe Val Leu Lys | |
| 33 1 5 10 15 | |
| 35 gag aaa aac ttc aca gtt gag ttc gcg gtg gag aag ata cac ctt ggc | |
| 36 Glu Lys Asn Phe Thr Val Glu Phe Ala Val Glu Lys Ile His Leu Gly | |
| 37 20 25 30 | |
| 39 tgg aag atc tcc ggc agg gtg aag gga agt ccg gga agg ctt gag gtt | |
| 40 Trp Lys Ile Ser Gly Arg Val Lys Gly Ser Pro Gly Arg Leu Glu Val | |
| 41 35 40 45 | |
| 43 ctt cga acg aaa gca ccg gaa aag gta ctt gtg aac aac tgg cag tcc | |
| 44 Leu Arg Thr Lys Ala Pro Glu Lys Val Leu Val Asn Asn Trp Gln Ser | |
| 45 50 55 60 | |
| 47 tgg gga ccg tgc agg gtg gtc gat gcc ttt tct ttc aaa cca cct gaa | |
| 48 Trp Gly Pro Cys Arg Val Val Asp Ala Phe Ser Phe Lys Pro Pro Glu | |
| 49 65 70 75 80 | |
| 51 ata gat ccg aac tgg aga tac acc gct tcg gtg gtg ccc gat gta ctt | |
| 52 Ile Asp Pro Asn Trp Arg Tyr Thr Ala Ser Val Val Pro Asp Val Leu | |
| 53 85 90 95 | |
| 55 gaa agg aac ctc cag agc gac tat ttc gtg gct gaa gaa gga aaa gtg | |
| 56 Glu Arg Asn Leu Gln Ser Asp Tyr Phe Val Ala Glu Glu Gly Lys Val | |
| 57 100 105 110 | |
| 59 tac ggt ttt ctg agt tcg aaa atc gca cat cct ttc ttc gct gtg gaa | |

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/909,464A

DATE: 02/05/2002
TIME: 12:16:21

Input Set : A:\PTO_VSK.txt
Output Set: N:\CRF3\02052002\I909464A.raw

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 60 | Tyr | Gly | Phe | Leu | Ser | Ser | Lys | Ile | Ala | His | Pro | Phe | Phe | Ala | Val | Glu |
| 61 | 115 | | | | 120 | | | | | | | 125 | | | | |
| 63 | gat | ggg | gaa | ctt | gtg | gca | tac | ctc | gaa | tat | ttc | gat | gtc | gag | ttc | gac |
| 64 | Asp | Gly | Glu | Leu | Val | Ala | Tyr | Leu | Glu | Tyr | Phe | Asp | Val | Glu | Phe | Asp |
| 65 | 130 | | | | 135 | | | | | | | 140 | | | | |
| 67 | gac | ttt | gtt | cct | ctt | gaa | cct | ctc | gtt | cta | ctc | gag | gat | ccc | aac | aca |
| 68 | Asp | Phe | Val | Pro | Leu | Glu | Pro | Leu | Val | Val | Leu | Glu | Asp | Pro | Asn | Thr |
| 69 | 145 | | | | 150 | | | | | | 155 | | | | 160 | |
| 71 | ccc | ctt | ctt | ctg | gag | aaa | tac | gcg | gaa | ctc | gtc | gga | atg | gaa | aac | aac |
| 72 | Pro | Leu | Leu | Leu | Glu | Lys | Tyr | Ala | Glu | Leu | Val | Gly | Met | Glu | Asn | Asn |
| 73 | | | | | | | | 165 | | 170 | | | 175 | | | |
| 75 | gcg | aga | gtt | cca | aaa | cac | aca | ccc | act | gga | tgg | tgc | agc | tgg | tac | cat |
| 76 | Ala | Arg | Val | Pro | Lys | His | Thr | Pro | Thr | Gly | Trp | Cys | Ser | Trp | Tyr | His |
| 77 | | | | | | | | 180 | | 185 | | | 190 | | | |
| 79 | tac | ttc | ctt | gat | ctc | acc | tgg | gaa | gag | acc | ctc | aag | aac | ctg | aag | ctc |
| 80 | Tyr | Phe | Leu | Asp | Leu | Thr | Trp | Glu | Glu | Thr | Leu | Lys | Asn | Leu | Lys | Leu |
| 81 | | | | | | | | 195 | | 200 | | | 205 | | | |
| 83 | gcg | aag | aat | ttc | ccg | ttc | gag | gtc | ttc | cag | ata | gac | gac | gcc | tac | gaa |
| 84 | Ala | Lys | Asn | Phe | Pro | Phe | Glu | Val | Phe | Gln | Ile | Asp | Asp | Ala | Tyr | Glu |
| 85 | | | | | | | | 210 | | 215 | | | 220 | | | |
| 87 | aag | gac | ata | ggt | gac | tgg | ctc | gtg | aca | aga | gga | gac | ttt | cca | tcg | gtg |
| 88 | Lys | Asp | Ile | Gly | Asp | Trp | Leu | Val | Thr | Arg | Gly | Asp | Phe | Pro | Ser | Val |
| 89 | 225 | | | | | 230 | | | | | 235 | | | 240 | | |
| 91 | gaa | gag | atg | gca | aaa | gtt | ata | gcg | gaa | aac | ggt | ttc | atc | ccg | ggc | ata |
| 92 | Glu | Glu | Met | Ala | Lys | Val | Ile | Ala | Glu | Asn | Gly | Phe | Ile | Pro | Gly | Ile |
| 93 | | | | | | | | 245 | | 250 | | | 255 | | | |
| 95 | tgg | acc | gcc | ccg | ttc | agt | gtt | tct | gaa | acc | tcg | gat | gta | ttc | aac | gaa |
| 96 | Trp | Thr | Ala | Pro | Phe | Ser | Val | Ser | Glu | Thr | Ser | Asp | Val | Phe | Asn | Glu |
| 97 | | | | | | | | 260 | | 265 | | | 270 | | | |
| 99 | cat | ccg | gac | tgg | gta | gtg | aag | gaa | aac | gga | gag | ccg | aag | atg | gct | tac |
| 100 | His | Pro | Asp | Trp | Val | Val | Lys | Glu | Asn | Gly | Glu | Pro | Lys | Met | Ala | Tyr |
| 101 | | | | | | | | 275 | | 280 | | | 285 | | | |
| 103 | aga | aac | tgg | aac | aaa | aag | ata | tac | gcc | ctc | gat | ctt | tcg | aaa | gat | gag |
| 104 | Arg | Asn | Trp | Asn | Lys | Lys | Ile | Tyr | Ala | Leu | Asp | Leu | Ser | Lys | Asp | Glu |
| 105 | | | | | | | | 290 | | 295 | | | 300 | | | |
| 107 | gtt | ctg | aac | tgg | ctt | ttc | gat | ctc | ttc | tca | tct | ctg | aga | aag | atg | ggc |
| 108 | Val | Leu | Asn | Trp | Leu | Phe | Asp | Leu | Phe | Ser | Ser | Leu | Arg | Lys | Met | Gly |
| 109 | 305 | | | | | 310 | | | | | 315 | | | 320 | | |
| 111 | tac | agg | tac | ttc | aag | atc | gac | ttt | ctc | ttc | gcg | ggt | gcc | gtt | cca | gga |
| 112 | Tyr | Arg | Tyr | Phe | Lys | Ile | Asp | Phe | Leu | Phe | Ala | Gly | Ala | Val | Pro | Gly |
| 113 | | | | | | | | 325 | | 330 | | | 335 | | | |
| 115 | gaa | aga | aaa | aag | aac | ata | aca | cca | att | cag | gcg | ttc | aga | aaa | ggg | att |
| 116 | Glu | Arg | Lys | Lys | Asn | Ile | Thr | Pro | Ile | Gln | Ala | Phe | Arg | Lys | Gly | Ile |
| 117 | | | | | | | | 340 | | 345 | | | 350 | | | |
| 119 | gag | acg | atc | aga | aaa | gcf | gtg | gga | gaa | gat | tct | ttc | atc | ctc | gga | tgc |
| 120 | Glu | Thr | Ile | Arg | Lys | Ala | Val | Gly | Glu | Asp | Ser | Phe | Ile | Leu | Gly | Cys |
| 121 | | | | | | | | 355 | | 360 | | | 365 | | | |
| 123 | gdc | tct | ccc | ctt | ctt | ccc | gca | gtg | gga | tgc | gac | ggg | atg | agg | ata | |
| 124 | Gly | Ser | Pro | Leu | Leu | Pro | Ala | Val | Gly | Cys | Val | Asp | Gly | Met | Arg | Ile |

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/909,464A

DATE: 02/05/2002
TIME: 12:16:21

Input Set : A:\PTO_VSK.txt
Output Set: N:\CRF3\02052002\I909464A.raw

| | | | | |
|-----|---|-----|-----|------|
| 125 | 370 | 375 | 380 | |
| 127 | gga cct gac act gcg ccg ttc tgg gga gaa cat ata gaa gac aac gga | | | 1200 |
| 128 | Gly Pro Asp Thr Ala Pro Phe Trp Gly Glu His Ile Glu Asp Asn Gly | | | |
| 129 | 385 | 390 | 395 | 400 |
| 131 | gct ccc gct gca aga tgg gcg ctg aga aac gcc ata acg agg tac ttc | | | 1248 |
| 132 | Ala Pro Ala Ala Arg Trp Ala Leu Arg Asn Ala Ile Thr Arg Tyr Phe | | | |
| 133 | 405 | 410 | 415 | |
| 135 | atg cac gac agg ttc tgg ctg aac gac ccc gac tgt ctg ata ctg aga | | | 1296 |
| 136 | Met His Asp Arg Phe Trp Leu Asn Asp Pro Asp Cys Leu Ile Leu Arg | | | |
| 137 | 420 | 425 | 430 | |
| 139 | gag gag aaa acg gat ctc aca cag aag gaa aag gag ctc tac tcg tac | | | 1344 |
| 140 | Glu Glu Lys Thr Asp Leu Thr Gln Lys Glu Lys Glu Leu Tyr Ser Tyr | | | |
| 141 | 435 | 440 | 445 | |
| 143 | acg tgt gga gtg ctc gac aac atg atc ata gaa agc gat gat ctc tcg | | | 1392 |
| 144 | Thr Cys Gly Val Leu Asp Asn Met Ile Ile Glu Ser Asp Asp Leu Ser | | | |
| 145 | 450 | 455 | 460 | |
| 147 | ctc gtc aga gat cat gga aaa aag gtt ctg aaa gaa acg ctc gaa ctc | | | 1440 |
| 148 | Leu Val Arg Asp His Gly Lys Lys Val Leu Lys Glu Thr Leu Glu Leu | | | |
| 149 | 465 | 470 | 475 | 480 |
| 151 | ctc ggt gga aga cca cgg gtt caa aac atc atg tcg gag gat ctg aga | | | 1488 |
| 152 | Leu Gly Gly Arg Pro Arg Val Gln Asn Ile Met Ser Glu Asp Leu Arg | | | |
| 153 | 485 | 490 | 495 | |
| 155 | tac gag atc gtc tcg tct ggc act ctc tca gga aac gtc aag atc gtg | | | 1536 |
| 156 | Tyr Glu Ile Val Ser Ser Gly Thr Leu Ser Gly Asn Val Lys Ile Val | | | |
| 157 | 500 | 505 | 510 | |
| 159 | gtc gat ctg aac agc aga gag tac cac ctg gaa aaa gaa gga aag tcc | | | 1584 |
| 160 | Val Asp Leu Asn Ser Arg Glu Tyr His Leu Glu Lys Glu Gly Lys Ser | | | |
| 161 | 515 | 520 | 525 | |
| 163 | tcc ctg aaa aaa aga gtc gtc aaa aga gaa gac gga aga aac ttc tac | | | 1632 |
| 164 | Ser Leu Lys Lys Arg Val Val Lys Arg Glu Asp Gly Arg Asn Phe Tyr | | | |
| 165 | 530 | 535 | 540 | |
| 167 | ttc tac gaa gag ggt gag aga gaa tga | | | 1659 |
| 168 | Phe Tyr Glu Glu Gly Glu Arg Glu | | | |
| 169 | 545 | 550 | | |
| 172 | <210> SEQ ID NO: 2 | | | |
| 173 | <211> LENGTH: 552 | | | |
| 174 | <212> TYPE: PRT | | | |
| 175 | <213> ORGANISM: Thermotoga maritima | | | |
| 177 | <400> SEQUENCE: 2 | | | |
| 179 | Met Glu Ile Phe Gly Lys Thr Phe Arg Glu Gly Arg Phe Val Leu Lys | | | |
| 180 | 1 | 5 | 10 | 15 |
| 183 | Glu Lys Asn Phe Thr Val Glu Phe Ala Val Glu Lys Ile His Leu Gly | | | |
| 184 | 20 | 25 | 30 | |
| 187 | Trp Lys Ile Ser Gly Arg Val Lys Gly Ser Pro Gly Arg Leu Glu Val | | | |
| 188 | 35 | 40 | 45 | |
| 191 | Leu Arg Thr Lys Ala Pro Glu Lys Val Leu Val Asn Asn Trp Gln Ser | | | |
| 192 | 50 | 55 | 60 | |
| 195 | Trp Gly Pro Cys Arg Val Val Asp Ala Phe Ser Phe Lys Pro Pro Glu | | | |
| 196 | 65 | 70 | 75 | 80 |

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/909,464A

DATE: 02/05/2002
TIME: 12:16:21

Input Set : A:\PTO_VSK.txt
Output Set: N:\CRF3\02052002\I909464A.raw

199 Ile Asp Pro Asn Trp Arg Tyr Thr Ala Ser Val Val Pro Asp Val Leu
 200 85 90 95
 203 Glu Arg Asn Leu Gln Ser Asp Tyr Phe Val Ala Glu Glu Gly Lys Val
 204 100 105 110
 207 Tyr Gly Phe Leu Ser Ser Lys Ile Ala His Pro Phe Phe Ala Val Glu
 208 115 120 125
 211 Asp Gly Glu Leu Val Ala Tyr Leu Glu Tyr Phe Asp Val Glu Phe Asp
 212 130 135 140
 215 Asp Phe Val Pro Leu Glu Pro Leu Val Val Leu Glu Asp Pro Asn Thr
 216 145 150 155 160
 219 Pro Leu Leu Leu Glu Lys Tyr Ala Glu Leu Val Gly Met Glu Asn Asn
 220 165 170 175
 223 Ala Arg Val Pro Lys His Thr Pro Thr Gly Trp Cys Ser Trp Tyr His
 224 180 185 190
 227 Tyr Phe Leu Asp Leu Thr Trp Glu Glu Thr Leu Lys Asn Leu Lys Leu
 228 195 200 205
 231 Ala Lys Asn Phe Pro Phe Glu Val Phe Gln Ile Asp Asp Ala Tyr Glu
 232 210 215 220
 235 Lys Asp Ile Gly Asp Trp Leu Val Thr Arg Gly Asp Phe Pro Ser Val
 236 225 230 235 240
 239 Glu Glu Met Ala Lys Val Ile Ala Glu Asn Gly Phe Ile Pro Gly Ile
 240 245 250 255
 243 Trp Thr Ala Pro Phe Ser Val Ser Glu Thr Ser Asp Val Phe Asn Glu
 244 260 265 270
 247 His Pro Asp Trp Val Val Lys Glu Asn Gly Glu Pro Lys Met Ala Tyr
 248 275 280 285
 251 Arg Asn Trp Asn Lys Lys Ile Tyr Ala Leu Asp Leu Ser Lys Asp Glu
 252 290 295 300
 255 Val Leu Asn Trp Leu Phe Asp Leu Phe Ser Ser Leu Arg Lys Met Gly
 256 305 310 315 320
 259 Tyr Arg Tyr Phe Lys Ile Asp Phe Leu Phe Ala Gly Ala Val Pro Gly
 260 325 330 335
 263 Glu Arg Lys Lys Asn Ile Thr Pro Ile Gln Ala Phe Arg Lys Gly Ile
 264 340 345 350
 267 Glu Thr Ile Arg Lys Ala Val Gly Glu Asp Ser Phe Ile Leu Gly Cys
 268 355 360 365
 271 Gly Ser Pro Leu Leu Pro Ala Val Gly Cys Val Asp Gly Met Arg Ile
 272 370 375 380
 275 Gly Pro Asp Thr Ala Pro Phe Trp Gly Glu His Ile Glu Asp Asn Gly
 276 385 390 395 400
 279 Ala Pro Ala Ala Arg Trp Ala Leu Arg Asn Ala Ile Thr Arg Tyr Phe
 280 405 410 415
 283 Met His Asp Arg Phe Trp Leu Asn Asp Pro Asp Cys Leu Ile Leu Arg
 284 420 425 430
 287 Glu Glu Lys Thr Asp Leu Thr Gln Lys Glu Lys Glu Leu Tyr Ser Tyr
 288 435 440 445
 291 Thr Cys Gly Val Leu Asp Asn Met Ile Ile Glu Ser Asp Asp Leu Ser
 292 450 455 460
 295 Leu Val Arg Asp His Gly Lys Lys Val Leu Lys Glu Thr Leu Glu Leu

RAW SEQUENCE LISTING
PATENT APPLICATION: US/09/909,464A

DATE: 02/05/2002
TIME: 12:16:21

Input Set : A:\PTO_VSK.txt
Output Set: N:\CRF3\02052002\I909464A.raw

296 465 470 475 480
299 Leu Gly Gly Arg Pro Arg Val Gln Asn Ile Met Ser Glu Asp Leu Arg
300 485 490 495
303 Tyr Glu Ile Val Ser Ser Gly Thr Leu Ser Gly Asn Val Lys Ile Val
304 500 505 510
307 Val Asp Leu Asn Ser Arg Glu Tyr His Leu Glu Lys Glu Gly Lys Ser
308 515 520 525
311 Ser Leu Lys Lys Arg Val Val Lys Arg Glu Asp Gly Arg Asn Phe Tyr
312 530 535 540
315 Phe Tyr Glu Glu Gly Glu Arg Glu
316 545 550

VERIFICATION SUMMARY

PATENT APPLICATION: US/09/909,464A

DATE: 02/05/2002
TIME: 12:16:22

Input Set : A:\PTO_VSK.txt

Output Set: N:\CRF3\02052002\I909464A.raw

L:12 M:270 C: Current Application Number differs, Replaced Current Application No
L:12 M:271 C: Current Filing Date differs, Replaced Current Filing Date